

# *The Driver's Missing Windshield: Enabling the Operator's Forward View Through Predictive Displays for Process Control*

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**Abstract**—Nuclear power plants, much like other process control industries, require the human operators to use indicators of current states or data historian trend displays to anticipate the next evolution of the plant. Such indicators demand considerable mental effort by the operators to be able to project the trajectory of the plant and its thousands of parameters. By analogy, this is much like driving a vehicle using only the side windows or the rearview mirror. Clearly, the best and safest way to drive the car forward is to look straight ahead through the windshield. Yet, what is the windshield that allows forward views for process control? In this presentation, we outline current work to develop visualizations to enable a virtual look-ahead in a nuclear power plant control room. Using a high fidelity simulation of a nuclear power plant, the Computerized Operator Support System provides prognostics to anticipate future events based on current indications. There are numerous human factors challenges to such a system, including the optimal method of visual presentation to the operators. Operators are already subject to alarm flooding, and they will not actually benefit from predictive dashboards for events that may not actually occur. The key human factors issue is not only the visual design of the predictive information display but also the assurance that added predictive information is reliable enough not to become a type of nuisance alarm for operators.